A new species in the genus *Dimorphacanthella* (Collembola: Isotomidae) from Sichuan Province, Southwest China

Yunxia GAO[1], Yun BU[2①], Lin HE[1①], Kai LI[1]

1. *School of Life Sciences, East China Normal University, Shanghai 200241, China*
2. *Natural History Research Center, Shanghai Natural History Museum, Shanghai Science & Technology Museum, Shanghai 200041, China*

Abstract: *Dimorphacanthella sichuanensis* Gao & Bu **sp. nov.** from Sichuan Province, China is described. It is characterized by the presence of two pairs of sensilla on Abd. III, 4 + 4 axial setae on Abd. II and III with Md seta present, and Abd. V with two pairs of slender medial sensilla and two pairs of thick lateral sensilla. The three known species of this genus are compared in detail.

Key words: springtails; chaetotaxy; sensilla; taxonomy

中国四川省二型刺等蛛属一新种记述（弹尾纲：等节蛛科）

高云霞 [1]，卜云 [2①]，何琳 [1①]，李恺 [1]

1. 华东师范大学生命科学学院，上海 200241；2. 上海科技馆，上海自然博物馆自然史研究中心，上海 200041

摘要：记述采自中国四川的等节蛛科 1 新种：四川二型刺等蛛 *Dimorphacanthella sichuanensis* Gao & Bu **sp. nov.**，其主要特征是腹部第 III 节背板具有 2 对感器；腹部第 II、III 节背板分别具有 4 + 4 中轴毛，具有 Md 毛；腹部第 V 节后缘具有 2 对细长的中间感器，侧面着生 2 对较粗的感器。文中还对该属已知种进行了区别比较。

关键词：跳虫；毛序；感觉器；分类

Introduction

The genus *Dimorphacanthella* Potapov & Bu, 2010 was established for *Tetracanthella anommatos* Chen & Yin, 1984 (Potapov *et al*. 2010). It contains two species: *Dimorphacanthella anommatos* (Chen & Yin 1984) and *Dimorphacanthella mediaseta* Potapov & Bu, 2010, and both are endemic to China. The most special character of the genus is that the juveniles and the adults have the different numbers of anal spines, which provides the name of the genus (Potapov *et al*. 2010). It differs from other genera with four anal spines in the same subfamily in the position of spines and the body sensilla (Potapov *et al*. 2010). During the identification of isotomid specimens from Sichuan Province, Southwest China, a new species in the genus *Dimorphacanthella* was identified and is described in the present

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① Corresponding authors, E-mails: buy@sstm.org.cn; lhe@bio.ecnu.edu.cn paper.

Material and methods

Specimens were collected by Tullgren funnels and preserved in 80% ethanol. The material was mounted in Hoyer's solution and dried in an oven at 50°C for identification. Observations were made using a phase contrast microscope (Leica DM 2500) and the photos were taken by a digital camera (Leica DMC 4500). Description of characters follows Potapov (2001), Potapov *et al*. (2010) and Bu *et al*. (2017).

Abbreviations used in the descriptions: Ant. — antennal segment; AO — antennal organ of antennal segment III; Th. — thoracic segment; Abd. — abdominal segment; a — anterior setae; p — posterior setae; s — sensillum; ms — microsensillum; bms — basal microsensillum on antennal segments; Md, Ml — dorsal and lateral macrochaeta.

Taxonomy

Family Isotomidae Schäffer, 1896

Genus *Dimorphacanthella* Potapov & Bu, 2010

Dimorphacanthella Potapov & Bu, 2010: 14. Type species: *Dimorphacanthella anommatos* (Chen & Yin), 1984.

Diagnosis. Isotomids with slender habitus. Body oligochaetotic. Pigmentation and ocelli absent. Integument regularly and slightly reticulated. Abdominal segments V and VI fused. Adults have 2 pairs of anal spines in p1 and x position respectively, while juveniles have only 1 pair (p1). Antennal segment III with two AO. Unpaired median seta p0 present on Abd. IV. Furca and tenaculum absent. Macrosetae and sensilla on body well differentiated (Potapov *et al*. 2010).

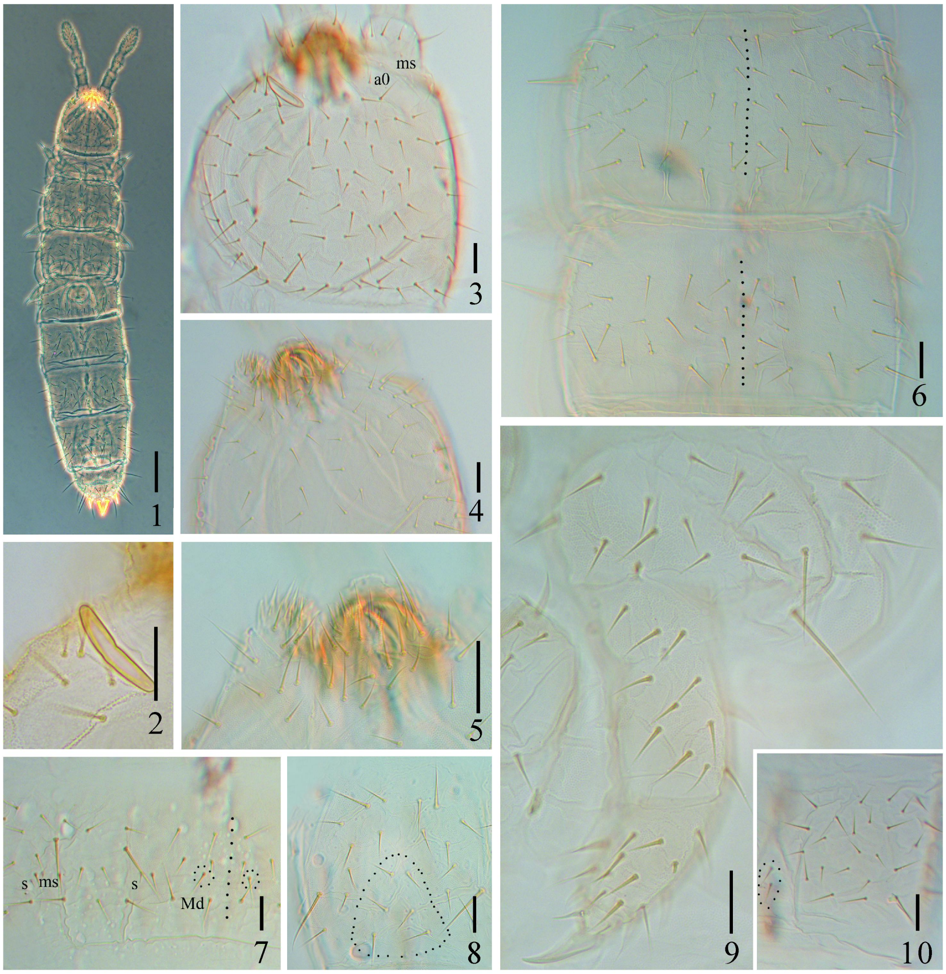
Distribution: China (Shanghai, Ningxia, Sichuan).

Dimorphacanthella sichuanensis **Gao & Bu sp. nov.** (Figs. 1–14, Table 1)

Description. Body slender, 1.03 mm long on average (0.95–1.1 mm, $n = 5$), holotype 1.06 mm (Fig. 1). Pigmentation and ocelli absent. Body with well visible reticulation. Postantennal organ narrow, constricted medially (Fig. 2), 25–30 μm long and 5–8 μm wide, 1.4–1.6 times as long as unguis 3 (20–22 μm). Head with short dorsal setae, a0 10–11 μm long (Fig. 3). Labium with all five papillae present (Fig. 5). Ventral side of head with 3+3 postlabial setae, 4 + 4 basomedial setae, 5 + 5 basolateral setae, 3 + 3 proximal setae (Figs. 4, 5).

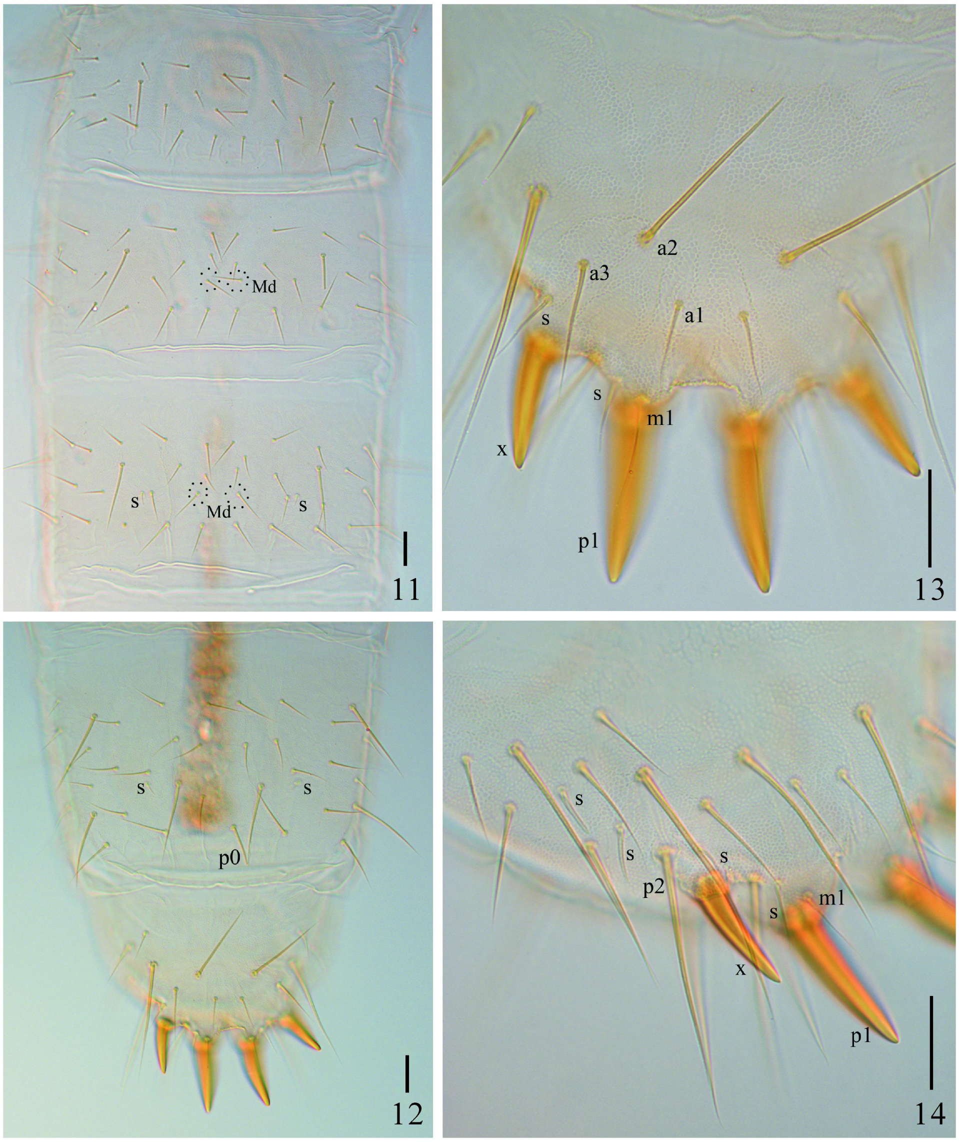
Antenna (185–195 μm) longer than head (150–165 μm), with similar sensilla pattern as in two known species. Ant. I with 11 setae, 2 ventral s (longer one 6–10 μm and shorter one 4–5 μm), 1 dorsal and 1 ventral bms (5 μm). Ant. II with 16–17 setae, 3 bms (4 μm) and 1 curved s (8–10 μm). Ant. III with 21–22 setae, 2 AO (4 μm) set in cuticular groove and 3 s (longer two 6–7 μm, shorter one 4 μm). Ant. IV with 22–24 well differentiated sensilla. Length ratio of antennal segments as 1 : 1.5 : 1.5 : 2.5.

Setae and sensilla on body well differentiated (Figs. 6, 11–14). Tergal sensilla on Th. II–Abd. IV 5–7 μm long, distinctly shorter than ordinary setae. Sensillary formula 2, 1 / 1, 1, 2, 2, 4 (s) (Figs. 7, 11–13). Abd. V with two slender and long middle sensilla (17–20 μm) (Fig. 13) and two thick lateral sensilla (14–18 μm) (Fig. 14). Microsensillary formula 1, 0 / 0, 0, 1 (ms). Tergal microsensilla 3–4 μm long, 0.6–0.8 as long as the sensilla (Fig. 7). Macrochaetotaxy 1, 1 / 2, 2, 2, 4 (Figs. 6, 11–12). Macrosetae 35–50 μm long. Axial chaetae on Th. II–Abd. IV as 10, 8 / 6, 8, 8, 7 (Figs. 6, 11–12), Md setae present on Abd. II and III (Fig. 11), p0 seta (35–40 μm) on Abd. IV 1.8–2.1 times as long as claw 3 (Fig. 12). Ml macroseta (45–50 μm) on Th. II, 2.8–4.1 times as long as p1 seta (16–20 μm). Sterna of Th. I–III with 0 + 0, 1 + 1, 3 + 3 setae, respectively.



Figures 1–10. *Dimorphacanthella sichuanensis* Gao & Bu **sp. nov.** 1. Habitus; 2. Postantennal organ; 3. Head, dorsal view; 4. Head, ventral view; 5. Labium; 6. Th. II and III, dorsal view; 7. Abd. III, left side; 8. Ventrum of Abd. IV; 9. Leg III; 10. Ventrum of Abd. III. Scale bars = 100 μm (Fig. 1); 20 μm (Figs. 2–10).

Claw of normal shape (Fig. 9), 16–20 μm long, without inner and lateral teeth. Unguiculus simple, without lamella, 7–10 μm long, 0.4–0.5 as long as claw 3 (Fig. 9). Tibiotarsus I–III with 21, 21, 22 setae respectively, without additional setae. Tibiotarsus without clavate tenant setae (Fig. 9). Ventral tube with 4 + 4 laterodistal and 4 posterior setae in one transversal row. Furca and tenaculum completely absent. Furcal subcoxa with 9 + 9 (10 in one specimen) setae, including two macrosetae in posterior position (Fig. 8). Manubrial field with 3 + 3 setae (Fig. 8). Retinacular field with 2 setae (Fig. 10). Abd. V with four strongly chitinized, robust anal spines arranged in one transversal row, inner pair (28–30 µm) 1.3–1.4 times as long as outer pair (35–43 µm) (Figs. 12, 13). Female genital plate with 3 pairs of circumgenital setae and 2 + 2 sensilliform curved eugenital setae. Male genital plate with 5 pairs of minute circumgenital setae and 3 + 3 eugenital setae.



Figures 11–14. *Dimorphacanthella sichuanensis* Gao & Bu **sp. nov.** 11. Abd. I–III, dorsal view; 12. Abd. IV–V, dorsal view; 13, 14. Sensilla and anal spines on Abd. V. Scale bars = 20 µm.

Holotype. ♀ Adult (slide No. SC-LT-2017001), **China**, Sichuan Province, Litang County, 29°46'N 100°27'E, elev. 3619 m, soil samples from coniferous forest, 13-VIII-2017, collected by Chengwang HUANG. **Paratypes.** 1♂ (slide No. SC-LT-2017002), 3♀ subadults (slides Nos. SC-LT-2017001, SC-LT-2017002), same data as holotype. All type specimens are deposited in Shanghai Natural History Museum (SNHM).

Diagnosis. *Dimorphacanthella sichuanensis* sp. nov. is characterized by the presence of two pairs of sensilla on Abd. III, 4 + 4 axial setae on Abd. II and III, and Abd. V with 2 + 2 slender medial sensilla and 2 + 2 thicker lateral sensilla.

Etymology. The species is named after the type locality.

Distribution: China (Sichuan).

Remarks. *Dimorphacanthella sichuanensis* Gao & Bu sp. nov. can be easily distinguished from its two congeners by the presence of two pairs of sensilla on Abd. III. It is affiliated with *D. mediaseta* in having Md setae on Abd. II and III, but differs in the chaetotaxy of Abd. I (Md seta absent in *D. sichuanensis* vs. present in *D. mediaseta*), Th. II and III (with fewer axial setae in *D. sichuanensis* vs. more in *D. mediaseta*) and the shape and length of sensilla on Abd. V (with long medial s and thick lateral s in *D. sichuanensis* vs. short medial s and slender lateral s in *D. mediaseta*). The three species of the genus can be distinguished by the characters listed in Table 1. Number of anal spines in small juvenile individuals is unknown.

Table 1. Comparison of the species of genus *Dimorphacanthella*

Characters	*D. sichuanensis* sp. nov.	*D. mediaseta* Potapov & Bu, 2010	*D. anommatos* (Chen & Yin, 1984)
Length (mm)	0.95–1.1	< 1	1–1.3
Sensillary formula	2, 1 / 1, 1, **2**, 2, 4	2, 1 / 1, 1, **1**, 2, 4	2, 1 / 1, 1, **1**, 2, 4
Dorsal axial setae	**10, 8** / **6, 8, 8**, 7	12(14), 10(9) / **8, 8, 8**, 7	10(12), 8 / **6, 6, 6**, 7
Medial s on Abd. V	long	short	short
Lateral s on Abd. V	thick	slender	thick

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